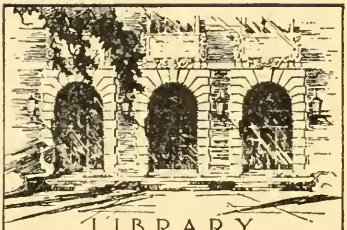

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BULLETIN NO. 39

BUREAU OF EDUCATIONAL RESEARCH
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TWO ILLUSTRATIONS OF CURRICULUM CONSTRUCTION

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PREFACE

The general theory of curriculum construction has received extensive consideration in our educational literature during the past ten years. Those who undertake the construction of a curriculum usually find it very difficult to apply this general theory because it is necessary to effect some adaptation to the particular field under consideration. This bulletin reports in a somewhat summary form the application of a general procedure of curriculum construction to two fields of instruction on the high-school level. The application to physical education was made by Mr. Darwin A. Hindman of Ohio State University; the one to horticulture by Mr. Roy S. Lundin, Principal, Community High School, Staunton, Illinois. In both cases the work was done under the immediate guidance of the Director of the Bureau of Educational Research while these men were graduate students at the University of Illinois. The original manuscripts were accepted as theses in partial fulfillment of the requirements for the master's degree.

In preparing this bulletin the Director of the Bureau of Educational Research has utilized only those portions of these theses that seemed to be essential in describing the method of working out the curriculum. No attempt has been made to publish the curricula formulated by these students. A reader who is interested in the complete theses will find them in the Library of the University of Illinois.

WALTER S. MONROE, *Director.*

November 22, 1927.

TWO ILLUSTRATIONS OF CURRICULUM CONSTRUCTION

CHAPTER I

THE GENERAL THEORY OF CURRICULUM CONSTRUCTION

The educative process. The child learns as the result of his own activities—perceiving, thinking, doing, and feeling. The outcomes of these activities are designated as *controls of conduct* (abilities), or achievements. Most of the *learning activities* in school occur in response to exercises set by the teacher and are based on or have to do with books, pictures, apparatus, and the like. These are called *materials of instruction.* A child's achievement—i.e., what he learns—is determined in part by the materials of instruction provided for his use. The learning exercises he is asked to do and the instructional procedures to which he is subjected are also potent factors, but they are partially determined by the materials of instruction. Hence the materials of instruction sustain an important relation to the educative process and the achievements of pupils.

The problem of curriculum construction. The central problem of curriculum construction is to select appropriate materials of instruction. Since materials of instruction and learning exercises are intimately related, the curriculum-maker sometimes specifies the former by enumerating the exercises to be used. Hence the central problem of curriculum construction may be described also as devising and selecting the learning exercises to be used.

This brief description of the central problem of curriculum construction does not adequately indicate what the curriculum-maker has to do. In order to determine the materials of instruction or learning exercises, it is necessary to determine first what the children should learn; that is, the objectives of the school. Then the curriculum-maker faces the task of determining the learning activities required for the attainment of the controls of conduct specified as objectives. Hence the logical steps in the construction of a curriculum are: (1) determination of objectives or controls of conduct to be acquired by the pupils; (2) determination of the learning activities required for this purpose; (3) determination of the materials of instruction and learning exercises that will form an efficient basis for the necessary learning activities.

Variation in terms in which objectives may be conceived. Although objectives were defined in the preceding paragraph as the controls of conduct that the children are expected to acquire, the term needs further explanation. The word objective in education is an adaptation of the military term. A military objective is a "point," the occupancy or capture of which is set by those in command as the goal for the advance of troops. For example, the city of Paris was the most important objective of the German army during the World War. Similarly in education, the learning activities in which children engage have or should have objectives. In describing educational objectives, writers have differed in their use of terms. The confusion resulting from such variation in terminology has been accentuated by the failure to define clearly the terms used. In order to give the reader a proper orientation, attention is called to three points of view.

1. Remote versus immediate objectives. The city of Paris was an objective for the German army. But Paris was a long distance away, and before it could be reached, other positions had to be taken and these positions became in military language "secondary objectives." Reaching a secondary objective required first reaching still nearer ones, and these, yet nearer objectives, and so on. At the other end of the scale, the taking of Paris was itself secondary to a larger objective, and this to a larger and so on until the ultimate objective is lost in metaphysical speculation.

In education, likewise, it must be recognized that there can be objectives, and sub-objectives, and super-objectives of all degrees. The objective in today's arithmetic lesson is the correct solution of certain problems. But why? Because it contributes to the more remote objective, the ability to solve other problems. But why the ability to solve problems? Because it is necessary to the objective of earning a living. But why earn a living? Because it contributes to a further objective, and this one to others, and so on until one finds himself facing the problem of human destiny. The objectives mentioned in this illustration by no means exhaust the possibilities, for between any two of those mentioned others can easily be thought of, and the first objective in the series can easily be made to yield subsidiary ones, so that it is possible to think of objectives of many degrees of remoteness or nearness. For some purposes it is helpful to classify objectives as ultimate or immediate, but when doing so it is necessary to remember that the remoteness or nearness of an objective is a relative rather than an absolute characteristic.

2. General versus specific objectives. A second relation between objectives is that some may be subdivisions of others; the same objective may be stated in one large unit or in a number of small ones. "Caring for one's health" is no more remote than "brushing one's teeth twice daily"; it is merely more general, more inclusive. Any division of character or of conduct can, in principle at least, be divided into many constituents which differ from the larger unit only in being more specific and less inclusive. Failure to maintain the distinction between the variation in size of unit and the variation in degree of remoteness is an important cause of confusion in the consideration of objectives.

3. Conduct objectives versus control objectives. The outcomes of learning activity are subjective qualities which function as controls of later conduct. In considering objectives, one may think either of the subjective controls of conduct or of the conduct which they control. For example, one may say that an objective is the performance by the pupil (in adult life) of the activities which constitute good citizenship, or that the objective is the possession by the student of the subjective equipment which will ensure such conduct on his part. One may state as an objective: "use of grammatically correct language," or "ability and disposition to use grammatically correct language." To give an example of a more specific objective: one may say an objective of arithmetic is "to respond with 'twelve' whenever the stimulus 'square-root of 144' is received," or he may say it is "the *habit* of responding with 'twelve' whenever the stimulus 'square-root of 144' is received." Similarly for any conduct objective of any degree of generalness, or of any degree of remoteness, it is possible to think of corresponding control objectives consisting of all the subjective qualities which are necessary in order to bring about the given conduct objective.

Consideration of remote objectives required because education in school is preparation for adult life. Some writers insist that the function of the school is to assist and direct pupils in realizing their present purposes rather than in attaining some remote good. However, the principal function of the secondary school (and probably of other schools as well) is to prepare youth for *adult* life. This principle is expressed by saying that the objective of the high school is the best possible adult life.[1] Hence the consideration of ultimate objectives is inevitable. We must look toward the future, but in doing so, we should not overlook the more immediate objectives.

[1]This is, of course, a conduct objective, expressed in the most general terms possible.

General character of immediate objectives. It has been explained above that for any unit in terms of which conduct may be described, there is a control objective which consists of all the subjective equipment necessary to ensure such conduct. In order to understand the nature of this subjective equipment, which becomes an immediate objective, it is helpful to recognize certain distinctions. The following analysis of controls of conduct has been proposed:

I. *Specific habits: motor skills and fixed associations.* Under this head are placed all those outcomes of learning activity that function as automatic or largely mechanical controls of conduct.

II. *Knowledge or adaptive controls of conduct.* Under the head of knowledge are grouped those controls of conduct (abilities) that function in overcoming difficulties presented by new situations.

III. *General patterns of conduct.* These include ideals, attitudes, interests, and tastes. Their general character is suggested by the *ideal* which may be thought of as a general pattern to which conduct will conform in a variety of situations.[2]

The controls of conduct usually classified under these rubrics do not alone determine what behavior shall be. They function on a foundation of general capacities and powers. General organic efficiency, general muscular strength, and general intelligence are also controls of conduct. They might be considered as elements of the controls of conduct usually classified as specific habits, knowledge, or general patterns of conduct, but for some purposes it seems desirable to recognize them as separate controls of conduct. Consequently, in the exposition of the objectives of a curriculum in physical education, these controls of conduct will be designated as "foundational" to distinguish them from the three rubrics given above which will be called "functional." These terms are suggested by Bobbitt:

> The foundational education is the unfoldment of the powers of the individual without consciousness of the relation of these powers to specific functions. The child at play, for example, is having experiences for the joy of the experiences . . . And yet his experiences are conditioning—and in a sense, producing—his general growth: physical, social, intellectual, aesthetic, moral . . . the experiences are to be carefully conditioned and guided by the teachers in such a way that they will lead to growth along physical, social and aesthetic lines of sorts that are needed as foundations of the specific abilities that are to be built thereon.[3]

Approach to the determination of objectives. The problem of determining immediate objectives is that of determining just which particular foundational and functional controls of conduct are needed for desirable adult life. The construction of a curriculum in the field of a particular school subject is restricted to the determining of those

[2]Monroe, Walter S. *Directing Learning in the High School.* Garden City, New York: Doubleday, Page and Company, 1927, p. 30-31.

[3]Bobbitt, Franklin. *How to Make a Curriculum.* Boston: Houghton Mifflin Company, 1924, Chapter V.

objectives that may be engendered in part or wholly by means of materials of instruction in that field. A preliminary step in the determination of immediate objectives is to formulate a description of the kind of adult life that is desirable. This has been done innumerable times, in extremely various terms, and with all degrees of generality. The following statement is typical:

> Education is the development of the individual by means of his own activity, in response to social influences, toward a realization of the values of life, and participation in the development of a society where the values of life will be realized by each in proportion to his capacity for such realization.[4]

Such a general description of desirable adult life should be kept in mind as a guiding influence, but in the practical task of curriculum construction, it furnishes little direct aid. It is necessary that adult conduct be analyzed and re-analyzed until units of working size are reached. Bobbitt has proposed the following ten groups of activities:

1. Language activities, social intercommunication
2. Health activities
3. Citizenship activities
4. General social activities—meeting and mingling with others
5. Spare-time activities, amusements, recreations
6. Keeping one's self mentally fit—analogous to the health activities of keeping one's self physically fit
7. Religious activities
8. Parental activities, the upbringing of children, the maintenance of a proper home life
9. Unspecialized or non-vocational practical activities
10. The labors of one's calling[5]

Courtis has given a slightly different analysis:

1. The nurturing activities—care of the immature, the ill, the unfortunate, the handicapped, the vicious
2. The maintenance activities—concerned with the consumption of food, clothing, shelter, specialized service, etc.
3. The recreational activities of leisure hours
4. The home-making activities of choosing mates, begetting children and raising them
5. The production activities, concerned with the preparation of food, clothing, shelter, specialized service, etc.

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[4]From a lecture by Professor E. C. Hayes, University of Illinois. The idea is given in expanded form, though not the definition itself, in: Hayes, Edward Cary. *Introduction to the Study of Sociology*. New York: D. Appleton and Company, 1918, Chapter XXXV. This chapter is an unusually valuable and stimulating discussion of education with emphasis, naturally, on the sociological aspects.

[5]Bobbitt, Franklin. *How to Make a Curriculum*. Boston: Houghton Mifflin Company, 1924, p. 8.

6. The self-improvement activities, of study, reflection, worship, etc.
7. Communication
8. Transportation and exchange
9. Government[6]

A committee of the North Central Association of Colleges and Secondary Schools suggests that the activities of life may be divided into four groups:

1. To maintain health and physical fitness
2. To use leisure time in right ways
3. To engage successfully in vocational activities
4. To sustain successfully certain definite relationships such as domestic, community, civic, and the like[7]

Further analysis necessary for the determination of functional objectives. The proper performance of the activities of any one of the above three lists could be considered to express, in very large units, the conduct objectives of education. The foundational controls, being very general in their scope, and influencing practically all of life rather than specific parts of it, do not require any further analysis of life activity for their determination. The functional controls of conduct, on the other hand, exert their influence over limited sections of life activity—in some cases over only very small and specific acts. For their determination, therefore, it is necessary that one consider the smaller and smaller units into which life activity can be analyzed. Accordingly, the next step in curriculum construction is to extend the analysis of adult life by subdividing the large units in terms of which the first analysis is expressed. The further this analysis is extended, the clearer will be the curriculum-maker's concept of the conduct objectives.

Objective methods of curriculum construction versus systematic and critical judgment. Our present curricula are frequently criticized on the grounds that they represent opinion. As a result of this criticism there have been many attempts to base the construction of a curriculum upon objective data; i.e., to employ procedures such that the resulting curriculum would be relatively independent of the opinions of its maker.[8] The illustrations of curriculum construction described in the following chapters involve little or no use of objective data. The

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[6]Courtis, S. A. "Reading Between the Lines," *Twenty-Sixth Yearbook of the National Society for the Study of Education,* Part II. Bloomington, Illinois: Public School Publishing Company, 1926, p. 97.

[7]"Report on Standards for Reorganization of Secondary School Curricula, 1924." North Central Association of Colleges and Secondary Schools. March 20, 21, 22, 1924, p. 6.

[8]*See* p. 34.

procedure employed may be described as "systematic and critical judgment." The general plan has been described in the preceding pages. In both cases, the first major step was to formulate an analytical description of the ultimate or conduct objectives for which the proposed curriculum was considered to contribute equipment. From these conduct objectives, the immediate or control objectives were derived. The last two steps include the predicting of the learning activities necessary for acquiring the specified controls of conduct, and the learning exercises that will serve as efficient bases for these activities.

Certain objective data would have been helpful in carrying out these steps, but "systematic, critical judgment" is believed to possess merit. Another curriculum-maker following the same procedure and governed by the same point of view probably would produce a somewhat different list of learning exercises, but it is difficult to believe that many of the differences would be fundamental. In any case, relatively few objective data are available for the teacher, principal, or superintendent who faces the task of constructing a curriculum for next year. Hence he is forced to rely largely upon "systematic, critical judgment."

CHAPTER II

CONSTRUCTING A CURRICULUM IN PHYSICAL EDUCATION FOR BOYS ON THE HIGH-SCHOOL LEVEL

Two general classes of objectives. In dealing with the objectives of physical education it appears helpful to distinguish between those that are foundational and those designated as functional.[1] However, the difference between foundational objectives and functional objectives is not so distinct as may at first appear. A human being is a unit, and efforts to divide him into mind, body, and spirit, or into faculties and processes, are certain to encounter difficulties if they are carried far enough. The foundational controls of conduct are often spoken of as being the product of "natural growth and development." They are probably no more the result of growth and development than are specific controls, and the word "natural" is most likely used as a result of a misapprehension. There is one sense, however, in which they are more natural than the functional controls. Nature herself has provided the individual with instinctive urges to engage in the educational activities for the engendering of these controls of conduct. Such activities are play.

Attempts to analyze fundamental powers and abilities difficult and misleading. Foundational controls of conduct are so fundamental and so general in their scope that it is difficult to ascertain their exact nature or to analyze them into small units. Functional controls of conduct, on the other hand, are more easily analyzed into small and relatively specific constituents. The results are a short and inconspicuous list of foundational objectives and a longer and more imposing list of functional objectives. A cursory reading of the two sets of objectives is likely to give a false impression of their relative importance. As a matter of fact, the foundational objectives of physical education are overwhelmingly more important than the functional. Physical education has its greatest duty to perform in replacing the natural work and play activities that formerly occupied so much of the life of children and securing if possible a better fundamental training and development.

Relative importance of foundational controls of conduct not so great at high-school age as in earlier years. It must be recognized, however, that the greatest need for the fundamental physical, intellectual, and social development from physical education is in the early

[1] *See* p. 10 for a description of these types.

years of life, probably before school age. When a child has reached high-school age he has lost forever the chance for much of the benefit which he might have received from physical education some years earlier. Also, it is very important that physical education in high school engender certain specific controls of conduct. This is not saying that the foundational objectives have become unimportant; they are still important, probably predominantly so. They are merely much less important, and the functional controls more important, than on the elementary-school level.

Points of emphasis in foundational objectives. It has already been stated that our knowledge of foundational controls of conduct is so limited and their nature is so peculiar, that it is difficult and misleading to attempt their complete description or analysis. However, it seems necessary as a guide for determining the general character of the learning activities, to indicate the foundational objectives that should be emphasized. The following outline is given, then, not with the idea that it is a complete analysis of the desirable foundational outcomes of physical education, but with the hope that physical education carried on so as to achieve these objectives will include the best possible "broad range of diversified activity."

Foundational objectives of physical education. The general nature of the foundational objectives in physical education is indicated in the following outline:[2]

A. Organic strength, efficiency, and skill
   1. Power and efficiency of the "vital" organs: circulatory, respiratory, digestive, and eliminative
   2. Nervous strength and efficiency
   3. Strength and endurance of the fundamental muscles
   4. General skill of the fundamental muscles

B. Foundational knowledge
   1. Knowledge of the world which comes from dealing with it in a motor way

[2]It is clear that there is a great difference between the objectives of group A and those of group B, and it seems also that the former group are foundational in a sense in which the latter are not. Accordingly, a good case can be made for separating the two groups, including group B with the functional objectives, or making them a third class. However, after long and careful thought and with some misgiving, it has been decided to leave them where they are, on the following grounds: (1) The objectives of group B must be included somewhere. An important duty of physical education is to see that children have the abundant and varied motor experience which will enable them to learn of the material world, of their own bodies, and of their companions. (2) These objectives cannot be included with the functional objectives. All objectives are, of course, functional, but the ones here called functional in a restricted sense are those controls of conduct which have *specific* functions to perform, while the objectives of group B above are to be engendered without any activity in mind much more specific than in the case of organic efficiency. (3) As bases for the selection of learning exercises, the two groups above have much in common. They demand educational experience of a certain type, not of an exact kind.

2. "Judgment in the speed, range, vigor, and timing of movements"[3]
3. Knowledge of the uses and limits of one's own power
4. Knowledge of one's human environment

Justification of the objectives of organic strength, efficiency, and skill. The foundational objectives classed under A might be considered as the results of proper growth and development of bodily mechanisms in structure and function. The importance of physical education for this development depends on two facts: first, that proper growth and development demand exercise of function; second, that the only way, under ordinary conditions, to regulate the exercise of function of the vital organs and the nerve centers is to reach them indirectly through the exercise of the muscles.

Man is provided by heredity with certain growth tendencies or potentialities. Proper growth, however, requires other conditions than the mere potentiality. Potential growth will become actual only with proper diet, proper rest, proper elimination, and other essential conditions. It is a fundamental law of growth that development of the organism in structure and function requires exercise of function. Every one understands that, if the arm of an infant should be strapped so that the muscles of this arm could not be used, the muscles would not grow and would soon lose all power to function. It is not always so clearly understood that the same statement is true of other functions and other parts of the body. A child's stomach that does not have exercise in performing its natural function will not develop as a stomach should. A similar statement can be made for all parts of the body, including the digestive, respiratory, and circulatory systems, and, let it not be forgotten, the nervous system.[4] The development of the visceral organs and of the fundamental nerve centers depends upon their being stimulated to vigorous normal functioning in the only way in which they can be so stimulated; viz., by a demand on the part of the muscles for their services in enabling the muscles to perform their work.

Justification of the objectives under "foundational knowledge." The expressions used in stating the objectives under "fundamental knowledge" are borrowed largely from John Dewey. His belief in the importance of varied motor and sense experience for the acquiring of this fundamental kind of knowledge is expressed in many passages, of which the following may be taken as a good sample:

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[3]Quotation from an unknown source.

[4]There are a few apparent exceptions to this rule, notably the reproductive system. The fact is, however, that the developing reproductive system has no reproductive function to perform; functioning does not appear until development is complete.

Physical growth is not identical with mental growth, but the two coincide in time, and normally the latter is impossible without the former. If we have reverence for childhood, our first specific rule is to make sure of a healthy bodily development. Even apart from its intrinsic value as a source of efficient action and of happiness, the proper development of the mind directly depends upon the proper use of the muscles and the senses. The organs of action and of reception are indispensable for getting into relation with the materials of knowledge. . . . Consequently the activities of the child are not so aimless as they seem to adults, but are the means by which he becomes acquainted with his world and by which he also learns the use and limits of his own powers.[5]

The use of the muscles and of the senses which are so necessary for the foundations of knowledge in the child are obtained very largely through play. Not all play, of course, comes within the definition of physical education. Much play is quiet and involves little or no big-muscle activity. But for the child and youth, play is predominantly of the physical-education kind, involving big-muscle activity, but with large sensory, intellectual, emotional, and social elements. Thus it is that second only to the duty of providing a needed condition for proper organic development is the duty of physical education to provide for boys and girls an abundance of intense and varied play experience.

The functional objectives of physical education. As pointed out in Chapter I[6] the determination of the functional objectives is approached by effecting an analysis of out-of-school life. The analyses suggested by Bobbitt and others do not appear to be very helpful as a basis for determining the functional objectives within the field of physical education. Consequently the following is proposed as a list of the principal fields of adult activity for which high-school physical education should be expected to engender functional controls of conduct:

I. The activities of maintaining health and physical efficiency
II. Spare time activities, amusements, recreations
III. General social activities—meeting and mingling with others
IV. Emergency activities requiring certain special strengths and skills
V. Parental activities—the upbringing of children[7]

It now remains to consider each of these groups of activities in order and to list the controls of conduct which it is believed physical education can contribute to their proper performance:[8]

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[5]Dewey, John, and Dewey, Evelyn. *Schools of Tomorrow.* New York: E. P. Dutton and Company, 1915, p. 7-8.

[6]*See* p. 11.

[7]Adapted from: Bobbitt, Franklin. *How to Make a Curriculum.* Boston: Houghton Mifflin Company, 1924, p. 9-10. All of the rubrics except IV are used by Bobbitt. Rubric IV was suggested by the following reference: "Aims and Scope of Physical Education," *American Physical Education Review,* 25: 254-261, June, 1920.

[8]There is no significance in the order in which the controls of conduct are mentioned.

I. The activities of maintaining health and physical efficiency

1. The health ideal (including not only a strong feeling of satisfaction in the possession of health and of annoyance at its lack, but also a strong feeling of satisfaction when doing one's best to maintain health and of insufferable annoyance when not doing so)
2. The practice of setting aside a regular time each day for physical exercise
3. Knowledge of the hygienic values of different forms of physical-education activity
4. Knowledge of the proper relation between time of exercise and time of meals
5. An attitude of pride in an erect and self-respecting carriage of the body
6. Knowledge of the distinction between good posture and poor, in one's self and in others
7. Knowledge of the value of a general vigorous workout for the prevention or relief of constipation
8. Ability to use abdomen-kneading exercises for the prevention or relief of constipation
9. Ability to control sex functions and emotions in the interest of health
10. Ability to secure vigorous and pleasurable exercise from using a medicine ball
11. Ability to use correctly one good set of calisthenic exercises
12. Ability to use for the double purpose of maintaining health and enjoying leisure time a variety of physical-education activities for different conditions of weather, available companions, and other factors

12A. Specifically, the ability to participate in as above, the following:

a. Playground baseball
b. Indoor baseball
c. Soccer football
d. Volleyball
e. Handball
f. Tennis
g. Boxing
h. Wrestling

i. Fundamentals of running[9]
j. Fundamentals of jumping[9]
k. Fundamentals of throwing[9]
l. Fundamentals of climbing, including the ability to climb a twenty-foot rope[9]
m. Swimming[10]
n. Diving
o. Stunts[11]
Backward circle on horizontal bar
Big drop from horizontal bar
Kip-up on horizontal bar

12B. The ability to participate properly in one of the above activities includes all of the following that can apply to the activity:
a. Skill in the performance of the activity
b. Knowledge of the rules of the activity
c. Knowledge of the values of the activity
d. Knowledge of the conditions for which the activity is best suited
e. Knowledge of the equipment needed for the activity
f. Ability to prepare, direct the preparation of, or select and purchase the equipment needed
g. Ability to teach the rules to others
h. Ability to help others develop skill in the activity
i. Knowledge of the kind of clothing that is most sensible for the activity under different conditions
j. The disposition to wear the most sensible kind of clothing for the activity
k. The ideal that physical-education activities are primarily to be practiced rather than watched (The functioning of this ideal will be manifested as a tendency to participate in activities rather than to watch them)
l. The disposition to do one's best when playing
m. The "play spirit"—i.e., the spirit of playing for the game itself, and of getting real joy from playing

[9]The idea here is not that the adult should be prepared to engage in formal contest in running, jumping, throwing, or climbing, but that he should have the fundamental abilities that can be used in improvised or other informal play activities.
[10]Standards of attainment are specified for both swimming and diving.
[11]A limited number of stunts are specified.

n. The spirit of constant courtesy to companions, opponents and officials
o. The attributes, beside those mentioned, which make one a true sportsman[12]

II. Spare time activities, amusements, recreations

13. Such a keen desire to engage in wholesome physical activity that one will turn to it in preference to less desirable forms of activity
14. Ability to secure the pleasures of a connoisseur as a spectator of the wholesome physical activities of others
15. The attitude of a sportsman when acting as a spectator at the physical activities of others
16. Ability to use for the double purpose of keeping fit and enjoying leisure time, a variety of physical-education activities
    16A. The same as 12A
    16B. The same as 12B

III. General social activities—meeting and mingling with others

17. Ability to participate in physical-education games and other activities as a means of becoming acquainted with pleasant and desirable people
18. Ability to participate in physical-education games and other activities as a means of social intercourse (as in playing cards)
19. A feeling of self-respect as a result of a knowledge of physical power and efficiency, and of possessing an erect and dignified carriage of the body
20. Skill in certain elements of social intercourse as a result of practice in social games
21. Ability and disposition to be courteous

IV. Emergency activities requiring certain special strengths and skills

22. The ability to save one's self from danger of drowning
23. The ability to save others from danger of drowning (as indicated by the ability to pass the Red Cross life-saving test)
24. The ability to run with fair speed and endurance
25. The ability to perform the simpler marching movements in cooperation with others under leadership
26. The ability to protect one's self, or others, from undesirable persons, and to rid one's self of such persons

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[12] *See*: Staley, Seward C. "The Program of Sportsmanship Education," *University of Illinois Bulletin*, Vol. 21, No. 49, Bureau of Educational Research Circular No. 28. Urbana, Illinois: University of Illinois, 1924, 27 p.

27. The ability to withstand physical hardship
28. The ability to bear heavy burdens
29. The ability to climb with power and sureness

V. Parental activities—the upbringing of children

30. The ability to control one's sex functions
31. The ability to provide one's children with the benefit of physical education in their growing years

The question of character-building. One of the favorite claims for physical education, especially athletics,[13] has been that it "develops character," or that it is "character-building." The explanation given has usually been that desirable social or moral qualities are exercised and strengthened by physical training. Among the qualities most often mentioned in this connection are: loyalty, self-sacrifice, initiative, resourcefulness, leadership, self-confidence, alertness, courage, aggressiveness, self-control, obedience to authority, and spirit of fair play. This conception is in terms of faculty psychology and as such has been rather effectively discredited. Nevertheless, the writers believe that the facts in the case are such as to make physical education an important agency in the development of desirable character.

Monroe explains character as "essentially a composite of the general patterns of conduct, especially ideals, which one possesses."[14] These general patterns of conduct are not inborn, but neither are they learned in the same way that knowledge or skills are learned. Rather they are acquired from one's associates through the processes that Hayes[15] calls "suggestion and sympathetic radiation."[16] It seems that physical education offers unusually favorable, in some ways unique, conditions for these processes to take place. The most important factor here is the unusual prestige of the leader. As Hayes says in another connection: "The play leader who knows more about the very things that interest them than the children do, who excels them in sports, who gives them the time of their lives, easily gains great prestige over them."[17] There are also other factors to be considered. For one thing, active social play abounds in obvious moral situations—in which decisions must be made and in which rights and duties must be deter-

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[13] *See,* for example, the editorials or other articles of John L. Griffith in almost any issue of his *Athletic Journal.*

[14] Monroe, Walter S. *Directing Learning in the High School.* Garden City, New York: Doubleday, Page and Company, 1927, p. 322.

[15] Hayes, Edward Cary. *Introduction to the Study of Sociology.* New York: D. Appleton and Company, Chapter XVII.

[16] As Monroe explains, general patterns of conduct are results of pupil activity, exactly as other controls of conduct are. The difference is in the way that the learning activity can be caused to take place, or can be guided. Learning activities leading to specific habits or knowledge can be commanded; those leading to general patterns of conduct cannot be commanded.

[17] Hayes, Edward Cary. *Op. cit.,* p. 674.

mined. Still another factor is the fact that it is easier to generalize many of the patterns of conduct involved in play activities than those of other school activities. Play life is real social life, as contrasted with the artificial and special character of most school life. For example, if a child actually develops the ideal of courtesy to opponents in games it is relatively probable, although by no means inevitable, that he will apply this ideal to his other social relations.

It seems, then, that physical-education teachers have a unique opportunity to exert favorable influence on the development of desirable character traits in their pupils. The physical-education teacher of the right kind is more than a teacher in the usual sense—he is an admired leader in the child's own world. Consequently, he should make character development a significant objective; in fact, he should consider it second in importance only to the development of organic power as the foundation of health.[18]

Character traits are not outcomes of engaging in physical-education activities. Nothing in the preceding paragraphs should be construed to mean that character and morals are developed by engaging in physical-education activities, but only that physical-education activities furnish a very favorable opportunity for these traits to be engendered under proper leadership.[19] The process by which ideals and other general patterns of conduct are engendered is quite obscure and one can do little more than to say that, under proper conditions, they are "produced as a by-product of the engendering of specific habits and knowledge."[20] Consequently the curriculum-maker cannot assign definite learning exercises for the engendering of ideals and attitudes, and can do little more than indicate the general patterns of conduct that should be objectives for the teacher.[21]

All character traits cannot be specified. Even to mention all of the general character traits and moral standards that might wisely be included as physical-education objectives is quite beyond the scope of

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[18]Organic development is placed first because here physical education (in school or out) is absolutely necessary and cannot be replaced, while in character training its functions can be performed by other activities.

[19]For an extended discussion of general patterns of conduct and an explanation of what is known about their acquisition *see*: Monroe, Walter S. *Directing Learning in the High School.* Garden City, New York: Doubleday, Page and Company, 1927, Chapter X.

[20]Hetherington makes this explanation: "All activities have character-training values *according to the instinct tendencies they exercise.* The *worth* of any activity for character discipline is determined primarily by the nature of the instincts and the emotions exercised. Some activities are better for the development of certain traits; others are better for the development of other traits. . . . The expressions of character or of morals may be good or bad, hence the development tends to be good or bad according to the leadership." (This sounds suspiciously like faculty psychology, but, taken with its context it is much less so than it sounds.)

Hetherington, Clark W. *School Program in Physical Education.* Yonkers-on-the-Hudson, New York: World Book Company, 1923, p. 27 and 29.

[21]On the development of ideals through athletics *see*: Kirkpatrick, William H. "Certain Moral and Social Aspects of College Athletics," *American Physical Education Review,* June, 1922.

any work no more pretentious than the present one, if indeed it can be done effectively at all. Aside from the intrinsic difficulty of making such an analysis is the fact that the nature of the objectives, being determined by many factors such as the present character of the pupils, qualifications and characteristics of the teacher, etc. varies greatly from one situation to another and can hardly be specified except for the individual set of conditions. Accordingly, those general character traits, or general patterns of conduct, that apply to activities having no relation to physical education, have not been included in the list of functional objectives. The writer will content himself by repeating that the physical-education teacher has a unique opportunity to engender in pupils ideals, attitudes, enthusiasms, and detestations, and that the positive endeavor to engender such of these character traits as under the condition seem possible and most desirable constitutes for him a prime duty.

On the other hand, those general patterns of conduct have been included whose function it is to regulate and control activities in which habits, skills, and knowledge are also included. Whenever one takes to himself the task of providing others with habits, skills, or knowledge, he should also equip them with the ideals, interests, enthusiasms, and hatreds which will ensure the wise and effective use of the habits, skills, and knowledge.

Relation between physical-education activities and learning exercises. The curriculum in physical education consists of learning exercises; that is, of specific things which pupils are requested to do. For example, in connection with swimming, a pupil may observe the teacher as he gives a demonstration, listen to an explanation, read a book of instructions, practice a certain breathing exercise, practice a particular leg stroke, swim twenty yards in a race with other pupils, and so on. The learning exercises in physical education are, by the very definition of physical education, based on, or centered around, or made necessary by, certain forms of play, athletics, gymnastics, dancing, or other kinds of physical-education activity. The values of physical education are to be obtained from the physical-education activities, and learning exercises are justified only as they contribute to the realization of these values, either by calling for practice of the activities, or by helping to engender controls of conduct which will govern future practice of the activities. Accordingly, the next step in the formulation of a physical-education curriculum must be the determination of the physical-education activities upon which this curriculum is to be based. This determination will be arrived at through an examination of the objectives with

a view to selecting the kinds of activities best suited to their achievement.

Development of organic strength, efficiency, and skill requires a large amount of motor activity. As has already been explained, the value of physical education for proper organic development is based on the fact that increased muscular activity causes increased organic activity. The primary requirement for the proper developmental effect of this activity is that it be vigorous and prolonged. Consequently, the activities which are selected with this first group of objectives in view must be those that give large amounts of work to all the fundamental muscle groups. Arm waving, toe touchings, dumb-bell swingings, and the like, have no value here. Further, the amount of activity needed for this objective is much larger than it is possible to include in any ordinary school program, and it follows that the activities used in school for this purpose must be such as will be practiced spontaneously by the children out of school hours.

This one fact should be sufficient to show the inadequacy of the traditional program of marching, drills, and calisthenics. The marching and drill program is not vigorous; it does not evoke the hearty cooperation of the pupils; it is not practiced in a healthy state of mind; and it is never resorted to spontaneously out of school. The activities which meet this objective must not only be valuable, but they must also be ones to which children will turn when they have spare time.

Foundational-knowledge objectives require varied experience. The primary requirement of activities selected for achieving the objectives of foundational knowledge is that they furnish a large amount of varied experience in handling one's own body, in using one's senses, in dealing with the fixed environment and with large objects, and in dealing with other persons.[22]

Activities for functional controls of conduct largely implied in objectives. The functional controls of conduct listed as objectives have to do largely with particular physical-education activities. Hence the basic activity is automatically determined by the objective itself, since obviously the basic activity in learning to engage in a game or other motor activity usually is the game or activity itself. Therefore, a mere inspection of the list of functional objectives will suggest a number of games and other activities that must be included in the curriculum.

[22] "While other and higher reaches of insight into human nature are gained through the specialized linguistic and social activities, for the majority of children the more fundamental insights are gained through big-muscle play." Hetherington, Clark W. *School Program in Physical Education.* Yonkers-on-the-Hudson, New York: World Book Company, 1923, p. 31.

Summary of criteria for the selection of physical-education activities. The criteria to be observed in selecting a physical-education curriculum may be summarized as follows:

I. The curriculum must include all of the activities specifically mentioned in the objectives; namely:
   a. All of the activities mentioned in objective 12A[23]
   b. Calisthenics to the extent necessary for acquiring the ability to use one set of calisthenic, or setting-up, exercises
   c. Enough throwing of the medicine ball to acquaint the pupils with its use
   d. Marching to the extent necessary to engender the ability to execute the simplest marching movements, and to furnish a foundation for acquiring skill in, and knowledge of, good posture
   e. Life-saving methods

II. A large per cent of the activities must provide for vigorous and prolonged use of all the large fundamental muscle groups;

III. The activities must provide for a varied experience in exploring and testing one's own powers, in using one's senses, in dealing with the physical environment, and in dealing with other people as part of one's environment;

IV. The activities of I and II must, and the others should when possible, be so pleasant and their practice result in such satisfaction as to lead to their spontaneous practice away from school;

V. They must include activities abounding in intensely social relations and in situations demanding moral decisions;

VI. They must include social games and activities that provide an opportunity for pleasant meeting and mingling with other people.

It is immediately apparent that many activities satisfy more than one of the above requirements. It is especially noticeable that the activities implied by objective 12A, comprising the major portion of those selected for adult use, seem to meet most of the important criteria. Naturally, if other things are equal, the activity that satisfies several of the requirements is better than one that satisfies but one. On the other hand, it is very important to have a balanced ration of learning

[23] As far as objective 12A (*see* p. 18) is concerned, these activities need to be included only to the extent necessary for acquiring the abilities to use them as adults. But they are also of great value in meeting other objectives and hence will be included to an extent not justified by this objective alone.

exercises. Taking into account the importance of a balanced ration, and the importance of each of the above ten requirements, it seems that the curriculum should be based on the following types of physical-education activity:

1. Stunts, or self-testing activities. These activities are the most useful of all for the development of foundational knowledge of one's own powers and of the material environment. They also provide vigorous activity, and are extremely enjoyable to boys of all grades of ability. Other advantages of stunts are the facts that they require no apparatus or only easily available apparatus (such as tree limbs, fences, etc.) and that they can be practiced by one person alone or by small groups.

2. Dancing. Athletic dances and the more vigorous folk dances are very valuable for their vigor and rhythmic appeal. Boys sometimes object to dancing on account of the name, but they soon learn to be extremely fond of it.

3. Group games and group relays. This class includes activities that are social, but which have either no teams at all or loosely organized and temporary teams. Many of the activities shade over into athletics; in fact, the whole group might be considered to be one form of athletics. The games or races can be enjoyed without previous practice and can be organized without notice, and are adaptable for groups of various sizes.

4. Individual athletics. These are measurable activities that can be practiced by one person alone or in competition with any number of others; for example, running, jumping, throwing, and climbing. There is never any resistance to the activity of one participant by others, as there is in athletic games. Compare, for example, competition in the hundred-yard dash or the running high jump with that in tennis or baseball.[24] These events shade off into stunts.

5. Athletic Games. In athletic games one team competes against another, and the activity of one is always resisted by that of the other. There is a fairly well-marked distinction between those games in which a team consists of one or two (e. g., tennis, handball) and those in which a team is larger. The games are all social and competitive and are nearly always vigorous.

6. Combative activities. These are chiefly boxing and wrestling, but include also minor activities such as Indian wrestling.

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[24]This distinction classes golf with individual athletics, rather than with athletic games.

7. Water activities. This class is really not coordinate with the others, but on account of its special nature, is so classified.

8. Marching. A small amount of ability in marching to command is sometimes very useful, as in fire-drills. Marching also furnishes a basis for learning correct posture and is useful in the physical-education class itself.

9. Calisthenics. The objectives should include the ability to use one calisthenic drill. With this exception, calisthenics do not contribute to the objectives anything that cannot be better supplied by other activities. Hence, calisthenics will be included, but only to the extent necessary for achieving the objective mentioned.

Many desirable activities excluded because impracticable. Many types of activities that are extremely desirable are omitted from the above list because they are not practicable in the ordinary school. For this reason ice and snow sports and bowling are omitted, as are boating, equestrianism, and many others.

Curriculum is for class time only. The curriculum which follows is intended to supply learning exercises for the class period only. It is assumed that the pupils will have the opportunity, either at the school or elsewhere, to practice the activities which they have learned in the class period. The school may properly cooperate with other agencies in organizing and directing the leisure-time activities of pupils, but this function of the school is not treated here.

SEVENTH GRADE[25]

I. Stunts, or self-testing activities[26]

A. Forward roll

1. Observe a demonstration of the stunt by the teacher;
2. Observe demonstrations by volunteers from the class, who believe that they can perform the stunt;
3. Listen to explanation and instruction by teacher;
4. Attempt to perform the stunt:
5. Receive criticisms and suggestions from the teacher and from pupils who have been successful;
6. Practice further until stunt is learned;

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[25]Only the curriculum for the seventh grade, the first year of the junior high school, is reproduced here. Mr. Hindman's thesis includes also the curricula for the other years.

[26]It is not considered practicable to list all of the stunts that are to be used. One reason is that the stunts and their nomenclature are not standardized and it is consequently impossible to describe them properly without illustrations. The present curriculum will include the learning exercises for all of the stunts that are to be learned permanently, and for samples of the others. For complete descriptions and illustrations of a great variety of stunts, the reader is referred to: Pearl, N. H., and Brown, H. E. *Health by Stunts.* New York: The Macmillan Company, 1919. 216 p. It is recommended that a class be given one fairly complicated stunt (such as the forward roll above) each month and from one to three or four minor stunts (such as the knee-dip above) each week.

7. Review stunt after it is expected to have been learned;
8. Take a test on ability to perform the stunt;
9. Perform the stunt frequently as a part of class work.

B. Elephant walk (for two boys)

10. Observe demonstration by two pupils under direction of teacher;[27]
11. Go through motions slowly on command of teacher;
12. Practice the stunt;
13. Request aid, if necessary, from teacher or from successful pupils;
14. Practice stunt until proficiency is attained;
15. Change places with partner and try again;
16. Practice informally for pleasure;
17. Review stunt occasionally in class;
18. Take a test on ability in stunt.

C. Knee-Dip

19. Observe demonstration by teacher (or try stunt at direction of teacher, without demonstration);
20. Practice until successful;
21. Try again after an interval of time.[28]

II. Dancing

A. Ace of Diamonds

22. Listen to the music and note the rhythm;
23. Observe the teacher as he demonstrates the entire dance;
24. Observe the teacher as he demonstrates the first step;
25. Without music, go through the motions of the first step very slowly according to the description and demonstration of the teacher;
26. Try the first step with the music;
27. Repeat 22-27 for the next step;
28. Combine first and second steps;
29. Repeat the process of analysis and synthesis until entire dance is learned;
30. Practice the dance for pleasure.

B. Seven Jumps

31. Learning exercises similar to the above.

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[27]This stunt can be done at the first trial by boys of average ability.

[28]The first two stunts to be mentioned are valuable after they are learned. The point to the knee-dip, on the other hand, is in learning to do it, and the stunt has little value for one who is proficient in doing it.

III. Group games and group relays[29]

A. Dodgeball

32. Take proper position on instruction from teacher;
33. Listen to an explanation of the game;
34. Observe a demonstration of important features of the game;
35. Play the game.

B. All-up Indian Club Relay

36. Take proper position according to instructions of teacher;
37. Observe a demonstration by teacher;
38. Engage in the relay as a contest.

C. Other games and relays

39. Participate in Black and White;[30]
40. Participate in Stake Guard;
41. Participate in Poison Snake;
42. Participate in Ball Pass Relay.

IV. Individual athletics

43. Observe a model of correct start for a sprint;
44. Practice correct starting for a sprint;
45. Run 25 yards in competition;
46. Compete in a relay race, running 25 yards;[31]
47. Practice the soccer dribble;
48. Compete against others in the soccer dribble;
49. Practice the volleyball serve;
50. Compete in the volleyball serve;
51. Practice throwing goals with a basketball;
52. Compete in basketball goal throwing, from various distances.

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[29]As with stunts, it is not possible to select in advance the exact games and relays that are best. The best ones and the number to be used will be determined by a large number of influences, such as nature of the play space, number of pupils, local traditions, play experience of pupils. Accordingly, the following games are given with the understanding that the list is to be altered, expanded, or abbreviated, as conditions seem to warrant.

The author feels that most teachers attempt to use too many different games and relays. The tendency is to use a poor game because it is a new one rather than an old one that is good. Let it be said again that there is little virtue in *learning* these games; they are to be *played*. The games listed here are all old and well-known, in most cases throughout the world.

[30]It is to be understood that participation in a game or relay implies such learning exercises as the ones listed for Dodgeball and for All-up Indian Club Relay.

[31]This is the comparatively formal relay for small teams, and is considered an athletic event. The relays previously listed are comparatively informal, are not usually practiced for proficiency, and are adapted for large and variable-sized teams. They are therefore considered group, or mass events.

V. Athletic games[32]

A. Speedball

53. Practice the dribble;
54. Practice hand passing in circle formation;[33]
55. Practice goal kicking from various positions;
56. Practice drop-kicking from various positions;
57. Listen to explanations of the rules by the teacher;
58. Read and study the rules;
59. Watch the older students play;
60. Play in a short game;
61. Play in other short games, occupying different positions on the team.

B. Basketball (No games played; learning exercises for basketball included under individual athletics)

C. Volleyball

62. Practice serving;
63. Practice batting from one player to another (on the same team);
64. Practice passing and "spiking";[34]
65. Listen to an explanation of the rules;
66. Study the rule book;
67. Practice passing in different "formation";
68. Play short games with the added rule that the ball must not be returned over the net before the third stroke.

D. Playground baseball

69. Practice throwing and catching in groups of two to six boys;
70. Practice pitching;

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[32]In view of the statement, repeated several times in this thesis, that the value from physical-education activities comes from engaging in them and not in learning them, it may seem that the learning exercises, especially under athletic games, include altogether too little actual participation in familiar activities, and too much learning of new ones. Two answers are offered to this objection: First, the thesis has assumed throughout that the activities must be practiced outside of the regular class hour and has attempted to follow the criterion that the activities used must be of such a nature that the pupils will be anxious to practice them outside of class hours. Consequently, when a fair degree of skill and knowledge is required for effective participation, it is here considered that the first duty of the school is to see that these are acquired. It is the firm opinion of the author that the school should organize the spare time of the pupils for participation in the activities, but the organization of the spare time is not considered here. Second, with the exception of basketball and speedball, the athletic games here included are expected to be practiced by the pupils when they become adults. Hence it is an important duty of the school to engender in the pupil the degree of skill and knowledge of the games which is essential to ensure their continued practice.

[33]According to the language of soccer, which has been largely borrowed by speedball, a "pass" is made with the foot; hence the necessity for the term "hand passing," which is not used in soccer.

[34]Volleyball should be played by seventh-grade boys with a net about a foot lower than the regulation height. As the boys become taller and more skillful the net should be raised gradually, the full height not being used by any players except full-grown and experienced ones. The eight-foot net for boys is another example, so common in athletics, of the standards of the professional or expert being forced upon boys and "dubs."

71. Practice throwing from base to base;
72. Practice catching batted flies;
73. Practice catching batted ground balls;
74. Practice bunting slowly thrown balls;
75. Practice easy hitting of slowly thrown balls;[35]
76. Practice hitting and placing slowly thrown balls;
77. Practice hitting balls thrown with ordinary pitching speed;
78. Listen to an explanation and demonstration of the most important rules;
79. Demonstrate knowledge of rules by setting up situations which explain them;
80. Play short games, rotating from one position to another.

VI. Combative activities

A. Minor combative activities;[36] practice such contests as:

81. Cockfight
82. Pulling Sticks
83. Back-to-Back Tug
84. Hand Wrestle

VII. Water activities

85. Without any attempt to swim, practice a number of exercises for overcoming the fear and sense of strangeness in the water, such as:

    Duck with nose held and eyes shut;
    Duck and count ten;
    Duck and open eyes;
    Duck, open eyes, and count fingers;
    Lie flat on water;
    Go to bottom in shallow water;

86. Following teacher, go through arm motions for crawl stroke, and then practice;
87. Holding edge of pool with hands, go through leg stroke, and then practice;

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[35]By far the most important element of baseball, at least as far as this thesis is concerned, is hitting. The chief reason why most players are such very poor hitters is that they "try to kill the ball," swinging wildly with the eyes shut or looking anywhere but at the ball. The exercises named in connection with hitting are designed to get the player into the habit of looking at the ball, and meeting it squarely, rather than trying to "knock the cover off."

[36]All of the minor combative activities mentioned in this thesis are described in one or both of the following books:

Johnson, George Ellsworth. *Education by Plays and Games.* Boston: Ginn and Company, 1907. 234 p.

Staley, Seward Charles. *Games, Contests, and Relays.* New York: A. S. Barnes and Company, 1924. 354 p.

88. Following teacher, practice breathing while standing and alternately ducking and withdrawing the head;
89. Without breathing and without moving legs, swim several strokes with the arms;
90. Repeat, adding the leg motion;
91. Repeat, adding the breathing;
92. Receive corrections and continue practice;
93. Repeatedly observe model of crawl stroke;
94. Repeatedly study written directions for crawl stroke;
95. Continue practice of crawl stroke until able to swim twenty yards;
96. Observe a model of a plain dive from edge of pool;
97. Attempt to make a plain dive;
98. Observe model, receive corrections, and try again.[37]

VIII. Marching[38]

99. Observe a model of correct standing posture;
100. Study a chart describing correct standing posture and common faults:[39]
101. Assume, with help if necessary, a correct standing position;
102. Practice assuming the correct position and slumping to ordinary one (assuming that the usual position is faulty);
103. Discuss in class the values of good posture and its nature;
104. Practice standing, walking, and sitting in good posture until it becomes habitual;
105. Practice following the command "forward march";
106. Practice following the command "class halt";
107. Practice following informally the commands "column left march" and "column right march";
108. Practice following the commands "right face, left face, about face."

[37] Ability to make a dive is not to be insisted on for the seventh grade, but the dive should be introduced so that students can practice it during the summer before taking it up in class in the eighth grade.

[38] It is not expected that any definite class time will be allotted to marching, but that the marching will be used in moving the pupils about for the other work, and thus learned, it might be said, incidentally.

[39] A set of six such charts, each 24 by 34 inches, can be purchased for fifty cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

CHAPTER III

CONSTRUCTING A CURRICULUM IN HORTICULTURE FOR THE HIGH SCHOOL

Concept of objectives. *In formulating the objectives of horticulture one should distinguish between ultimate and immediate objectives.* Ultimate objectives are those that look to the future. They are the standards, the goals toward which educational endeavor is directed. They represent the conduct or the desired behavior of adults or of the pupil after he leaves school or when he is out of school. Ultimate objectives are also known as conduct objectives. Educational writers have proposed numerous statements of headings under which ultimate or conduct objectives may be grouped. The list proposed by the Commission on the Reorganization of Secondary Education of the National Education Association,[1] known as the "Cardinal Principles of Secondary Education"; the list of the North Central Association of Colleges and Secondary Schools;[2] and the list of objectives proposed by Bobbitt[3] are well-known statements of captions for classifying conduct objectives.

Ultimate, or conduct, objectives are sometimes listed as rather vague terms, using such generalizations as citizenship, health, and ethical character, as defined in the statement of the "Cardinal Principles of Secondary Education." They may also be defined by specifying the duties to be performed or the occasions for the functioning of the controls of conduct. It does not make a great deal of difference how these ultimate objectives are stated. Personally the writer prefers the second type of statement—in terms of duties or occasions for the use of abilities.

Immediate, or control, objectives are the abilities or controls of conduct which pupils are to acquire. These act as determinants of conduct and are to be engendered by the school in order that the conduct designated by the ultimate or conduct objectives may be realized. They are controls leading to the attainment of the conduct objectives. They are the direct outcomes or products of learning activity on the part of the pupil. They are a means towards an end. The ultimate objectives are the end. An illustration from the field of horticulture

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[1]Commission on the Reorganization of Secondary Education. "Report on Cardinal Principles of Secondary Education," *United States Bureau of Education Bulletin,* 1918, No. 35. Washington: Government Printing Office, 1918.

[2]"Report on Standards for Reorganization of Secondary School Curricula, 1924." North Central Association of Colleges and Secondary Schools, March 20, 21, 22, 1924, p. 6. *See* p. 12 of this bulletin.

[3]Bobbitt, Franklin. *How to Make a Curriculum.* Boston: Houghton Mifflin Company, 1924, p. 8-9. *See* p. 11 of this bulletin.

will make this distinction clear. We may say that one ultimate aim of horticulture is the efficient production of orchard products by the pupil after he has left school or even while he is in school. To attain this end many controls of conduct must be acquired by the pupil; such as: the ability to control insects and fungus diseases by spraying, the ability to prune fruit trees in the best known manner, the ability to fertilize the trees, the ability to cultivate the trees, the desire to have an efficient orchard, and so forth. It is the aim of the work in horticulture to engender these abilities or controls of conduct in the particular divisions of the field that are chosen by the individual school.

The relationship between ultimate and immediate objectives is this: ultimate or conduct objectives are the goals, or desired future behavior, while the immediate or control objectives are the means of reaching these goals.

Technique of determining conduct objectives. *The best conceivable forms of adult horticultural activity, as determined by analysis and appraisal of the activities in which farmers engage, are to be taken as the objectives of horticulture.*[4] The conduct objectives can be determined only by a thorough study of the horticultural activities in which farmers engage. Charters[5] gives four methods of making activity or job-analyses; namely, by introspection, interviewing, working on the job, and by the questionnaire. Introspection is the method used by those already familiar with the job in which the duties are to be analyzed. In the second method, the interviewer asks the one performing the job to list his activities. In the third method, the one making the analysis performs the job by carrying through the activities himself. The written questionnaire is sometimes used as a method of analysis, but this method is not very satisfactory.

Bobbitt summarizes the method of activity-analysis he used in the determination of objectives after the major fields of human action have been defined. He takes what he calls the major fields and analyzes them into their more specific activities. "In this analysis, one will first divide his field into a few rather larger units, and then break them up into smaller units . This process of division will continue until he has found the quite specific activities that are to be performed."[6] These are the immediate objectives of the field.

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[4]This method of determining objectives is the same as that given in the following: "The Foundations of Curriculum-making." *The Twenty-Sixth Yearbook of the National Society for the Study of Education,* Part II. Bloomington, Illinois: Public School Publishing Company, 1926, p. 12-13.

[5]Charters, W. W. *Curriculum Construction.* New York: The Macmillan Company, 1925, p. 38-39.

[6]Bobbitt, *op cit.,* p. 9.

The determination of the activities by job or activity-analysis tells us what things people do. It does not automatically tell us what are to be the objectives of horticulture, however. For example, a survey of practices in connection with the care of the home orchard in a given community might show that the majority of farmers having fruit trees do not spray or prune their trees according to the methods recommended by their own state experiment station. It is obvious that the abilities to prune and to spray trees should not be left out of a statement of objectives. The curriculum-maker must put such abilities into the list. Or, if in considering another phase of insect control, the curriculum-maker finds that farmers are laboriously picking or knocking off the Colorado potato beetles from their potato vines, he should not neglect to include the ability to spray the vines with the proper insecticide to control the pests in question, rather than to set up the common practice as a desirable one. Evaluation or appraisal of the activities is necessary. Some of the activities are good and should be perpetuated. These selected activities should be made objectives of horticulture. Other activities are not good and should be eliminated. An analysis of horticultural activities will determine only what are the common practices. To determine those which are good and those which are bad is equally important.

Provision for differences between individuals. *There should be different expectations with respect to the accomplishment of pupils who learn rapidly and those who learn slowly.* All pupils cannot reach the same goal. The effort should be made to engender in the pupil those habits, ideals, attitudes, interests, and other general patterns of conduct and adaptive controls of conduct that will enable him to take the place he desires in horticultural activities out of school. Not all, probably, desire to reach the same goal. The pupil should be encouraged to do the best that he can. Superior pupils will cover more ground than will those who learn less rapidly. They should be permitted to do so, for it is through these superior pupils that our future advancement will come. There should be certain minimum essentials of the materials of horticulture which all pupils must cover. The better pupils should be required to do additional work. For instance, in setting up the abilities or immediate objectives of horticulture, one should include those that have been determined to be most important, which all pupils should be required to master, and others which the teacher may demand of the better pupil in addition to the minimum essentials. The ideal scheme would be to set up immediate objectives for each pupil, but this is not possible. This would be individual instruction, or rather curriculum-

making for each individual pupil, and as such is not considered in this study.

Provision for differences between communities. *There should be different objectives in the curriculum in horticulture in different communities.* There is a great difference in the horticultural activities of communities. In portions of western and southern Illinois there are extensive commercial orchards. In the northern part of Illinois there are extensive areas devoted to vegetable gardening. In other portions of the state the only horticultural activities engaged in are those of the home vegetable garden and the home orchard. The curriculum should be adapted to the needs of the community in which the school is located. But this should not be carried too far. There are certain abilities and skills which are common to all those engaging in horticultural activity of any kind. These should not be slighted. For instance, such activities as the care of the home vegetable garden, of the home orchard, and the growing of potatoes for home use, at least, are common to all communities. They should not be left out in a community where some special type of horticultural activity, such as commercial apple growing, is dominant.

Allowance for out-of-school learning. *Allowance should be made for education received through other agencies than the school such as the home, the community, and the extension service of the state agricultural college.* This principle recognizes the fact that some boys taking the high-school work in horticulture may have had extensive experience at home in some of the work covered by the high-school curriculum in horticulture. For instance, in many counties there are boys' and girls' agriculture clubs which give instruction in certain phases of agriculture; such as: the production of corn, potatoes, strawberries, apples, and so forth; the feeding and care of livestock, such as swine, sheep, poultry, dairy cattle, and beef cattle. If the pupil has official record of his work approved by his club leader, it would be unwise to insist that he go through with the same kind of work again. For him, the immediate objectives could be adjusted. He should be given other work to do.

The school's duty in engendering ideals, attitudes, and so forth. *The curriculum in horticulture should engender ideals, attitudes, appreciations, tastes, and other general patterns of conduct, as well as skills and knowledge.* The terms "ideals," "attitudes," "appreciations," "tastes," and so forth are called general patterns of conduct. They are plans, outlines, or patterns. These general patterns are more permanent, more lasting, than the controls included under the term knowl-

edge. Ideals, for instance, are spoken of as "master-ideas."[7] In addition to the intellectual element there is an emotional element which adds power in controlling conduct. Some ideals commonly known are those of honesty, loyalty, patriotism, neatness, accuracy, and so on. The term "attitudes" is applied to another group of patterns of conduct. They are less tangible than ideals, but are also very important in determining conduct. Some common terms which designate certain attitudes are "prejudiced," "radical," "open-minded," "conservative," "scholarly," and so on. Interests, tastes, and desires are also patterns of conduct. We speak of an interest in sports, a taste for good literature, good taste in selecting one's clothing or in furnishing one's home, a desire to produce a crop of the finest apples or to have a vegetable garden which will supply the family with the vegetables needed, and so forth. All of these patterns are powerful determinants of conduct or behavior.

How are these general patterns of conduct to be engendered? The ideals, attitudes, interests, and tastes of the teacher are very important in engendering these controls of conduct. The pupil can be interested in horticulture and may develop a desire to partake of an activity by being shown how others have succeeded, and by having the proper examples held up before him at every opportunity. The teacher should emphasize accuracy and neatness in the performance of a job by refusing to accept work lacking in these qualities. The teacher should have these general patterns of conduct in mind and should himself feel that the desired outcomes are worthy. His faith and belief will be expressed in his acts, in the tone of his voice, in the expression on his face. "As he thinketh in his heart, so is he." The curriculum-maker can do little more than indicate the general patterns of conduct which should be considered a desirable part of the pupil's learning.

The other types of controls of conduct are well known. Specific habits are automatic or largely mechanical controls of conduct which function in familiar situations. They are known as fixed controls of conduct. They are stored-up controls on hand to be used as needed. Names, dates, events, or other facts which have been memorized belong to this group. In addition, there are many habits which provide automatic motor responses. Examples of these are found in typewriting, swimming, sewing, playing the piano, and so on. In the field of horticulture, the farmer or fruit-grower is spoken of as being an expert pruner, or skilled in spraying, or in thinning apples on the trees. This means that he has performed these different operations so many times

[7]Bagley, W. C., and Keith, John A. H. *An Introduction to Teaching.* New York: The Macmillan Company, 1924, p. 241.

that their performance has become habitual. Specific habits provide ready-made responses to familiar situations.

The third type of control of conduct is that known as knowledge. Under this term we group those controls that function in overcoming difficulties presented by new situations. They are commonly referred to as ideas, concepts, meanings, principles, and laws. The distinction between specific habits and knowledge is mainly on the basis of the type of situation for which a response is provided. If the situation is familiar and one possesses a ready-made response, the control of conduct is called a specific habit. If the situation is new; that is, if it presents a problem to be solved, knowledge is the term given to the control of conduct that functions. The controls belonging to the group classed as knowledge are known as adaptive controls of conduct. It is obvious that there cannot be enough fixed controls of conduct (specific habits) to take care of the great number of situations that are constantly arising in our present-day life. Even if ready-made responses could be set up, there would be no way of knowing what the future has in store for the pupil.

Bobbitt's analysis unsatisfactory as a basis for constructing a curriculum in horticulture.[8] There is no doubt in the writer's mind that horticulture may contribute to groups of activities or forms of conduct named by Bobbitt other than the vocational activities—such as health activities; spare-time activities, amusements, and recreations; keeping one's self physically fit; unspecialized or non-vocational activities; and so forth. But it is probable that other subjects of the high-school curriculum provide more efficiently for the above objectives than does horticulture. A subject such as physical education, for example, which has for its primary goal the activities leading to better health, will, no doubt, function more effectively towards establishing the health objectives than can the study of horticulture whose primary object is to equip the individual with such controls of conduct that he may perform the various essential horticultural activities. Hence it has seemed wise to base the construction of the curriculum in horticulture upon a different analysis of out-of-school life, restricting it to the field of horticulture.

Methods used in determining conduct objectives in this thesis. A study of the horticultural activities of farmers of the corn-belt section of Illinois was made by the writer[9] in the manner described below. During the past year, while the writer was a graduate student at the

[8] *See* p. 11 for Bobbitt's analysis. Compare this statement with the one on p. 17 relative to constructing a curriculum in physical education.

[9] The writer is Mr. Lundin, from whose thesis the material for this chapter was taken.

University of Illinois, he had the opportunity to interview a number of teachers of vocational agriculture of the State. From them he was able to ascertain some of the things which should be included in the high-school courses in vocational agriculture. At the same time, he obtained the opinions of members of the department of horticulture of the University of Illinois on this subject. These men have the opportunity of studying horticultural conditions in the state in their work among the farmers. Especially is this true of the extension horticulturists of the department of horticulture whose work takes them regularly into all parts of the State. The opinions and observations of such men appeared to the writer to be very much worthwhile and reliable.

During the past year, the writer, as an instructor in the University of Illinois, has come into intimate contact with a group of young men in the freshman courses in horticulture. Interviews with these young men have given him many valuable points of information in regard to the horticultural needs of their own home farms.

Before attending the University of Illinois as a graduate student, the writer was for six years connected with the agricultural extension service of Purdue University, as county agricultural agent, in two counties in portions of Indiana very similar agriculturally to the Corn-Belt of Illinois. This work brought him into close touch with the conditions and needs of farmers of the counties in which he was located.

The conduct objectives in horticulture. As a result of the study of horticultural activities of the Corn-Belt of Illinois and of similar portions of Indiana, made in the manner given above, it is the writer's belief that the following general objective is the one towards which the high-school course in horticulture should strive: *the economical production of fruits and vegetables, primarily for home use.* To make this very general objective more specific and more easily understood, the following seven conduct objectives, or activities, are given:

A. Planning the work (This includes such factors as: deciding to have a garden or orchard; selecting the location and site; selecting and purchasing seeds, trees, and plants; making plans for the garden and orchard)

B. Starting the plants (This includes: testing and inspecting seeds and plants, caring for seeds and plants before planting, preparing the ground for planting, setting out trees and plants in the orchard and small fruit garden, planting vegetable seeds in the open and under glass, and constructing and operating the hotbed and coldframe)

C. Growing the plants (This includes: transplanting vegetable plants, maintaining and supplying plant food and organic matter, cultivating the orchard and garden, growing cover crops and intercrops and preventing washing and erosion of the soil, forcing vegetables, and intensive cropping)

D. Pruning and thinning

E. Preventing damage by insects, diseases, and other plant pests

F. Harvesting and storing the crops

G. Marketing fruits and vegetables

Each of the conduct objectives, or activities, is to be considered in connection with the crops of the following:

1. The home vegetable garden (including such crops as: tomatoes, sweet corn, sweet potatoes, Irish potatoes, onions, cabbage, peppers, lettuce, turnips, beans, melons, and so forth)
2. The home orchard (including such crops as: apples, peaches, pears, cherries, plums, and so forth)
3. The small fruit garden (including such crops as: blackberries, strawberries, grapes, raspberries, currants, gooseberries, and so forth)

In other words, the following simple table will show how the seven above-named activities will apply to the crops of the home vegetable garden, the home orchard, and the small fruit garden:

A. Planning the work
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

B. Starting the plants
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

C. Growing the plants
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

D. Pruning and thinning
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

E. Preventing damage by insects, diseases, etc.
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

F. Harvesting and storing the crops
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

G. Marketing fruits and vegetables
   1. The home vegetable garden
   2. The home orchard
   3. The small fruit garden

The above-named seven activities designate the types of conduct or behavior which the control objectives should enable the individual to perform.

Methods of determining controls of conduct. The methods used by the writer in determining the controls of conduct to be engendered are those of job or activity-analysis by introspection and by interviewing.[10] The seven activities or conduct objectives were divided into smaller sub-units, and under each of these the abilities needed as controls of conduct were listed. The results of this procedure are illustrated by the conduct objectives placed under the first activity:

PLANNING THE WORK

A. Deciding to have a garden or orchard

1. Knowledge of the value of fruits and vegetables for food, such as their importance in supplying necessary proteins, fats, minerals, vitamins, and so forth (Exercises 1, 2)[11]

2. Knowledge of the economic importance of fruits and vegetables, such as their value in the United States, Illinois, and the local community (Exercise 3)

3. Appreciation of the work of such agencies as agricultural colleges, experiment stations, and the United States Department of Agriculture, in improving the varieties and methods of producing fruits and vegetables (Exercises 4, 5, 6, 7, 8, 9)

4. Desire to have an efficient garden or orchard which includes the determination to do the necessary work, spend the necessary

[10]Charters, W. W. *Curriculum Construction.* New York: The Macmillan Company, 1925, p. 38-39.

[11]After each of the objectives listed in this chapter, reference is given in parenthesis to the learning exercise requesting the pupil to perform some activity. The exercises referred to are given in numerical order beginning on p. 51.

money, and do the necessary studying to make the project a success (Exercises 1, 2, 3, 4, 7, 9)

5. Faith in scientific methods of orchard management, vegetable growing, and so on, as recommended by the agricultural experiment stations (Exercises 4, 5, 6, 7, 8, 9)

6. Willingness to take advantage of available information pertaining to fruit and vegetable growing, such as is found in bulletins of experiment stations, in farm papers, and from individuals producing these crops successfully (Exercises 4, 5, 6, 7, 8, 9)

7. Appreciation of the large amount of available material relating to fruit and vegetable growing, such as the materials published by experiment stations, reports of investigations by individuals, and so forth (Exercises 4, 5, 6, 7, 8, 9)[12]

B. Selecting the location and site

8. Knowledge of the kinds of soils best suited for the production of fruits and vegetables (Exercises 11, 12)

9. Knowledge of the temperature requirements of the different fruits and vegetables (Exercises 13, 14, 16)

10. Knowledge of the moisture requirements of the different fruits and vegetables (Exercises 13, 14)

11. Knowledge of the capital, labor, and information necessary to establish an orchard and to operate it efficiently (Exercise 10)

12. Knowledge of the water and air drainage of the land to be used in the production of fruits and vegetables (Exercises 12, 15, 16)

13. Ability to provide proper water drainage for the orchard and garden (Exercises 12, 15)

14. Knowledge of the effect of elevation and of the proximity of large bodies of water on the production of fruits and vegetables, especially the former (Exercises 12, 15, 16)

15. Knowledge of the reasons for the success or failure of particular fruit and vegetable crops in the community (Exercises 12, 14, 15, 16, 17, 18, 19, 20, 21)

16. Ability to avoid locations where the soil may be infected with soil diseases, such as fusarium wilt of tomatoes, cabbage yellows, and so forth (Exercises 17, 18, 19, 20, 21)

17. Ability to select the best site on a given farm for fruits and vegetables (Exercise 22)

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[12]General patterns of conduct, such as are listed under each of the units in this chapter, may be concomitant or indirect outcomes of *all* of the learning exercises. The teacher must have these general patterns in mind when assigning learning exercises or when otherwise directing the pupil's learning activity. *See* p. 36f.

C. Selecting and purchasing seeds, trees, and plants

18. Knowledge of the reliability of dealers and growers of nursery stock and vegetable seeds (Exercises 23, 24)

19. Ability to understand the descriptions used in nursery and seedsmen's catalogues (Exercises 23, 25, 27)

20. Ability to select the kinds and varieties of fruits and vegetables best suited to local climatic and soil conditions (Exercises 23, 26, 27, 28)

21. Ability to select kinds and varieties of fruits and vegetables most desirable for immediate use in the farm home (Exercises 23, 26, 27, 28)

22. Ability to select kinds and varieties of fruits and vegetables most desirable for home storage for use during the winter months (Exercises 23, 26, 27, 28)

23. Ability to select the kinds and varieties of fruits and vegetables best suited to market demands (Exercises 23, 26, 27, 29)

24. Ability to determine the number of each kind of trees and bushes to include in the orchard and small fruit garden (Exercises 23, 26, 27, 30, 32)

25. Ability to determine the amount of each kind and variety of vegetables to include in the vegetable garden (Exercises 23, 26, 27, 31, 32)

26. Ability to order the seeds, plants, and trees (Exercises 23, 25)

D. Making plans for the garden and orchard

27. Knowledge of habits of growth and time of maturity of vegetables in the home garden (Exercise 33)

28. Ability to make a garden plan (Exercises 33, 34, 35)

29. Ability to make a plan of the orchard and small fruit garden (Exercises 33, 36)

30. Appreciation of the value of making definite plans of any kind of farm work before the season opens (Exercises 33, 37)

31. Appreciation of the importance of carefully thinking over the operation of the farm work before beginning to do the actual job (Exercises 33, 37)

Types of materials of instruction. Materials of instruction are the tangible or observable things which a student uses in the course of his learning activities. They include textbooks, maps, charts, farm animals, trees, woods, rivers, factories, adult activities in the community that may be visited, and so on. Materials of instruction are not learning exercises, but they afford a basis for learning exercises. Materials

of instruction are the things on which the curriculum-maker has his attention centered in building a curriculum. He selects materials of instruction for the learning activities of the pupil so that the latter may develop certain controls of conduct which in turn determine future conduct or behavior. Stating it in another way, the learner uses materials of instruction in his learning activities to develop certain controls of conduct which in turn will determine his future behavior. A learning exercise comes first in the chain just suggested. Not until the learning exercise is comprehended by the learner does he make use of the materials of instruction in his learning activities.

The definition of materials of instruction just given is, of course, very general. Something simpler is needed to make the term more clear. Materials of instruction may be divided into four main groups[13] as follows:

A. Verbal statements
B. Visual aids
C. Apparatus
D. Extra-school environment

"Verbal statements" are things that the pupil may read or hear. Included under this head is probably the most important of the materials of instruction: namely, the textbook. Supplementary reading materials, such as magazines, books other than texts, newspapers, bulletins, and so forth, are included under "verbal statements," as are also the spoken words of the teacher or others.

"Visual aids" are materials that the pupil observes but does not manipulate. Included under the heading come such things as maps, charts, pictures, moving pictures, demonstration apparatus, and so on. They are used by the teacher or someone other than the class.

"Apparatus" is the term applied to the materials the pupil handles or uses. Some of these may have been used by the teacher as visual aids before the pupil uses them. For instance, the class in horticulture may first observe a demonstration put on by the teacher or someone else in pruning an apple or peach tree, in the mixing of spray materials, in the manipulation of a spray gun or rod, or in any of the things which may make up the laboratory work in horticulture. The pupil may then be required to handle or use some of the apparatus itself as a part of his learning activity.

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[13]These groups of materials of instruction are referred to again on p. 51f., where each learning exercise is followed by a reference containing one or more of the letters *A*, *B*, *C*, and *D*. These letters refer to the groups of materials of instruction herein described; namely, *A* refers to verbal statements, *B* to visual aids, *C* to apparatus, and *D* to extra-school environment.

"Extra-school environment" includes such things as adult activities in the community which may be visited by the pupil as part of his learning activity. The pupil in horticulture may need to visit orchards, gardens, or farms near the school to study various operations in horticulture. When a study is being made of the selection of land to be used for growing peaches, for instance, the class may visit several good peach-growing sites, and some poor ones, too. The teacher may supplement the laboratory work in the construction of hotbeds or cold-frames by taking his class to study the methods of a market-gardener or truck-grower who is producing a large number of plants under glass and who has equipment that would emphasize points of importance.

Outcomes resulting from use of materials of instruction. There are two general types of outcomes resulting from the proper use of the materials of instruction in horticulture that the curriculum-maker and teacher must recognize. These are intrinsic outcomes and concomitant outcomes. Intrinsic outcomes are those which are intimately connected with particular items of materials of instruction; for example, certain specific habits or skills. For instance, in the use of apparatus such as a small garden sprayer, a definite type of skill will be acquired by the pupil. In operating a wheel-hoe skill may also be acquired. In the use of textbooks and other verbal statements, knowledge may be acquired by the pupil. These are the outcomes resulting from the use of the particular materials of instruction and no other.

Other outcomes, such as general patterns of conduct—ideals, attitudes, tastes, interests, and so forth—are somewhat independent of the materials of instruction. As explained before, a general pattern of conduct is a control that functions in a variety of situations and which stimulates one to make his conduct conform to a pattern. An ideal of accuracy or of honesty may have a marked influence upon one's conduct. A desire to do a thing is a potent factor in determining behavior. For example, a pupil in horticulture may possess the knowledge and skill required to treat seed potatoes with corrosive sublimate for scab before planting, but he is not likely to apply these controls of conduct unless he has a *desire* to do so or possesses the ideal of a field of clean, marketable potatoes as a result of his activity, the preference for clean potatoes rather than scabby ones, or some such general pattern of conduct.

Principles governing the selection of materials of instruction. *Those materials of instruction must be selected that will be most effective in engendering the controls of conduct that have been agreed upon as the immediate or control objectives of horticulture.* There are some

materials of instruction that will be more effective in engendering certain controls than will others. For example, if the curriculum had for one of its immediate objectives the attainment of skill in pruning grape vines, the most efficient materials of instruction for the accomplishment of this skill would be: an unpruned vineyard, pruning shears, the teacher's directions, and probably some pictures illustrating what was wanted. Obviously, this skill could not be acquired by the pupil from reading a book or by listening to a lecture. Practice in doing the job alone would engender the skill desired. If knowledge of the life habits of the Colorado potato beetle were to be acquired, pictures, charts, and the actual live specimens, accompanied by the teacher's explanation might be very efficient materials of instruction, while a very technical textbook in entomology might be of little aid to the high-school pupil.

Learning takes place most effectively and economically under conditions which are vital and worth while to the learner.[14] This means that those materials of instruction should be selected that will contain much of the factor of lifelikeness or of naturalness. The learner should feel that the situation is worthy of his efforts and attention. Learning is best acquired when the pupil identifies himself most completely with the thing to be learned. This is not always possible since some activities in the field of horticulture are not intrinsically interesting. However, interest may often be stimulated by the type of materials used. For example, the pruning of young apple trees in an orchard would be a more lifelike situation than the pruning of a few branches or small trees brought into the laboratory. Again, to engender in the pupil the ability to select a good orchard site, a visit to several places in the community would be more lifelike and interesting than reading about this topic or studying pictures showing orchard sites.

The materials of instruction in horticulture should be adapted to the interests and needs of the pupil. Counts emphasizes a principle similar to the one above when he says, "Nothing should be included in the curriculum merely because it is of interest to children; but whatever is included should be brought into the closest possible relation with their interests."[15] In the curriculum in horticulture the class may be studying certain diseases of tomatoes—wilt disease—for instance.

[14]Counts says, "Learning is prosecuted most effectively when the individual identifies himself most completely with the thing to be learned. Only under these conditions is there neither dispersion of attention nor dissipation of energy."
Counts, Geo. S. "Notes on the Foundations of Curriculum-making." *The Twenty-Sixth Yearbook of the National Society for the Study of Education,* Part II. Bloomington, Illinois: Public School Publishing Company, 1926, p. 79.

[15]Counts, *op. cit.,* p. 80.

One kind of materials of instruction would be pictures or slides showing this wilt disease. Another kind would be the teacher's description of the disease. Another and far more interesting kind of materials of instruction would be actual tomato plants infected with the disease.

The materials of instruction should also be adapted to the needs of the pupil. They should be of such a nature that they will be of use to the pupil in his out-of-school life. For example, in constructing a hotbed, it would be of little value to most pupils to construct one to be heated by steam or hot water since such materials are seldom available on the farm. The construction of a simple manure hotbed would afford more practical training for boys in a rural community. The adaptation of the materials of instruction to a pupil's out-of-school life is also important in other school subjects, but sometimes the use of unusual materials of instruction is justified for exploratory purposes. For example, in manual training the pupil often has the use of planers, jointers, sanding machines, and so forth, in his school work which he will probably never have opportunity to use out of school unless he finds employment in the wood-working industry. The only justification for such elaborate materials of instruction would be for exploratory purposes. That is, the pupil may be introduced to such materials so that he may be helped to determine the field of work for which he is best suited. However, the curriculum-maker should keep in mind this factor of the needs of the pupil, especially out of school, in selecting materials of instruction in horticulture.

These two principles—the one just discussed and the principle of lifelikeness—are very closely related to each other. It is believed, however, that each is of sufficient value in horticulture to be considered as a separate principle.

Only those materials of instruction should be selected which are reasonably available and which are within the means of the school and the pupil. The materials of instruction should be readily obtainable when wanted without the loss of much time or effort. The pupil's time is valuable. It would be unwise to have him spend a great amount of time and energy journeying to visit a distant commercial plantation of asparagus or rhubarb, for instance, when such materials could be obtained closer to the school, even if not in exactly the form or quantity considered the most desirable. It seems that there should be no question but that the materials of instruction should be obtainable without too great an expense to the school or the pupil. The discussion on the phases covered under this principle seems to resolve itself into this —the materials of instruction must be practical.

Materials of instruction should be selected that are suited to the qualifications of the teachers of vocational agriculture. While this principle is undoubtedly important in the construction of curricula for many high-school subjects, it can scarcely be considered very important in the field of vocational agriculture of which horticulture is a part. Teachers in vocational agriculture are required by ruling of the State Board of Vocational Education to be graduates of agricultural colleges whose work is of acceptable quality. These young men should be able to handle any of the materials that could be used in teaching horticulture to classes of high-school pupils. For this reason the factor of qualifications of the teachers is not important.

Organization of the materials of instruction. After the objectives of horticulture have been determined and the materials of instruction which the pupil is to use in acquiring the desired controls of conduct have been selected, the next problem is "How shall these selected materials of instruction be organized for teaching purposes?" This question might be answered generally by saying that the materials of instruction should be so grouped and distributed that in using them in his learning activities the pupil will acquire the desired controls. The principles that have guided the writer in the organization of the materials of instruction refer to the following factors:

1. The time to be given to the various units of horticulture
2. Consideration of other subjects in the school
3. The best time for using a given unit of materials of instruction
4. The best place for using a given unit of materials of instruction
5. The best method of using a given unit of materials of instruction

In the organization of the materials of instruction in horticulture the first thing to consider is the amount of time which shall be given to the different units of horticulture. Horticulture, as has been explained in an earlier part of this thesis, is composed of several units. In regard to the time to be given to the different units which have been decided upon as a part of the curriculum, the writer has aimed to emphasize those of greatest value to the community. How much time is a unit worth? In the central part of the State, the Corn-Belt, the dominant types of agriculture are grain and livestock farming. Generally speaking, there is little interest in horticultural activities except in the production of vegetables and fruits for home use. The teacher must determine just what phases of these horticultural activities are most suitable to his school and community, and emphasize these activities. For instance, if he feels that potato growing should receive

considerable attention he can use more time for this phase of horticulture and cut down on his time for something else. If an improvement in the home orchards of the community is felt to be necessary, the teacher may emphasize the abilities leading to the attainment of this condition.

In the organization of the materials of instruction, consideration must be given to other subjects in the high school. There are many materials of instruction that might advantageously be included in the curriculum if horticulture were the only subject in the school. There are many places that could be visited, such as distant orchards, gardens, farms, stores, warehouses, and so on, which would require so much time that the pupil would have to neglect other school work. Certain class projects, such as the care of a large orchard, the production of several acres of potatoes, and the spraying of fruit trees in the community, might involve the use of excellent materials of instruction; namely, the large orchard, the field of potatoes, the fruit trees in the community that need spraying, and the equipment necessary to care for these things. But if the use of these materials of instruction would conflict with other valuable work of the school, it might be best to leave them out of the curriculum, or to adopt other materials that would take less time.

The curriculum-maker should determine the best time for using a given unit of the materials of instruction. In organizing the materials of instruction the question "When shall a given unit of materials be used as a basis for learning exercises?" is an important one in horticulture. There is undoubtedly one time that is better than any other time to introduce a given unit of the materials of instruction. In horticulture the seasonal use of materials of instruction will be most lifelike or natural. In engendering the ability to prune young peach trees, for instance, the early spring would be the most seasonal time to perform this job. The orchardist would do the job at that time. In the construction of a hotbed, the early spring or late winter would be the time the vegetable gardener would be doing this job. The pupil would be most interested in using such materials at or as near as practical to the time the hotbed would actually be needed. To make a hotbed in the early fall would be to perform this job out of season. In the use of the materials of instruction for the dormant spraying of apple trees for San Jose scale, these materials should be used in the winter or early spring at or near the time the apple grower would be performing the operation. This factor of season not only affects the naturalness of the materials of instruction but it is closer to the needs of the pupil.

The curriculum-maker should determine where the materials of instruction are to be used. This principle is similar to the one just discussed. In organizing the materials of instruction, the question of the place in which to use the materials is important. Shall all of the materials of instruction be brought to the classroom or school laboratory, or shall the class be taken to visit the place where the proper materials are found? Some materials are best used in their natural setting. Examples of this type of materials of instruction are found in many of the horticultural specimens with which the pupil must work. Again using the young peach trees as the materials of instruction for engendering ability to prune this type of tree, the factor of lifelikeness would be greatest if the peach trees were used in the peach orchard rather than if specimens were brought into the classroom. Under this principle, too, the needs of the pupil are better met if he goes into the peach orchard to learn how to prune the trees.

The curriculum-maker should indicate the best method for using a given unit of materials of instruction. How shall the materials of instruction be used by the pupil? In engendering the ability to construct a vegetable storage pit, for instance, shall each pupil actually perform the various operations himself or shall the class observe a demonstration put on by the teacher and one or two others? Again referring to the example cited before, the pruning of young peach trees, the curriculum-maker must determine whether a demonstration by the teacher or the actual doing of the pruning by each member of the class would be best. Undoubtedly, the latter case would be most lifelike for the pupil, and best suited to the needs of his after-school life. There are many other factors under this simple principle which require study. In pruning the young peach trees, several types of materials of instruction might be used. The teacher might give a lecture on pruning of the trees, followed by a demonstration by himself, and then have the members of the class do the job. Or he might take his class directly to the orchard and have them tackle the job after they had made a study of illustrative material in texts or bulletins. The curriculum-maker should indicate which method is best in his organization of the materials of instruction.

The learning exercises. The learning exercises determined are illustrated by the following which are proposed as a basis for the attainment of the first objective given on page 39.

PLANNING THE WORK

A. Deciding to have a garden or orchard

1. Study in textbook and in bulletins the value of fruits and vegetables in the human diet; (Materials A; objectives 1, 4)[16]

2. Inquire of teacher of home economics or others the importance of vitamins, proteins, etc. in the diet; (Materials A; objectives 1, 4)

3. Listen to a lecture and study in textbook the economic importance of fruits and vegetables in the United States, in Illinois, and in the county or community; (Materials A; objectives 2, 4)

4. Listen to a talk on the work of such agencies as agricultural colleges, experiment stations, and the United States Department of Agriculture, in improving varieties and methods of producing marketing fruits and vegetables; (Materials A; objectives 3, 4, 5, 6, 7)

5. Examine publications of own state experiment station to get an idea of its work in improving varieties and methods of producing and marketing fruits and vegetables; (Materials A; objectives 3, 5, 7)

6. Obtain information from home or elsewhere of the work of experiment station, agricultural college and other extension agencies in the community; (Materials A; objectives 3, 5, 6, 7)

7. Listen to a discussion of the successes of individuals in the community who have followed the advice of such educational agencies as the agricultural college, experiment station, etc.; (Materials A; objectives 3, 4, 5, 6, 7)

8. Visit successful growers of fruits and vegetables in the community who have made a success in their horticultural activities. Obtain from them their opinions of the importance of the agricultural college, experiment station, etc.; (Materials D; objectives 3, 4, 5, 6, 7)

9. Examine a few farm papers or magazines and note emphasis placed upon horticultural activities; (Materials A; objectives 3, 4, 5, 6, 7)

B. Selecting the location and site

10. Listen to a lecture regarding the capital, labor, and information necessary to establish and operate an orchard; (Materials A; objective 11)

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[16]The first part of the parenthetical statement refers to the type of materials of instruction to be used. (*See* p. 44.) The second part of the reference refers to the objective or control of conduct which is to be the outcome of the pupil activity resulting from the learning exercise given. (*See* p. 41f.) For example, Material A indicates that verbal statements are the materials of instruction used in this exercise. Objective 1 means that this exercise will contribute to bringing about the ability indicated, which is as follows: "Knowledge of the value of fruits and vegetables for food, such as their importance in supplying necessary proteins, fats, minerals, vitamins, and so forth." It does not necessarily mean that this exercise will result in the desired outcome, but it will, at least, make some contribution towards the desired result.

11. Study in textbook and bulletins and discuss the kinds of soils best suited for the production of fruits and vegetables; (Materials A; objective 8)

12. Visit several orchard sites in the community. Pick out the most desirable sites for orchards from the point of view of the proper soil and air drainage, the proximity to large bodies of water, etc.; (Materials C; objectives 8, 12, 13, 14, 15)

13. Study in textbook and discuss the temperature and moisture requirements of different fruits and vegetables; (Materials A; objectives 9, 10)

14. Study records of weather bureau to determine climatic characteristics of the community; (Materials A; objectives 9, 10, 15)

15. Study the water drainage of sites under consideration and recommend methods of improving it; (Materials C; objectives 12, 13, 14, 15)

16. Determine the importance of the proximity of large bodies of water in the production of fruits; (Materials A; objectives 9, 12, 14, 15)

17. Make a list of fruits and vegetables which have been successful in the community and a list of fruits and vegetables which have not proved successful; (Materials A; objectives 15, 16)

18. Listen to a lecture, and study in textbook and bulletins the effect of soil diseases on certain crops; (Materials A; objectives 15, 16)

19. Study photographs and pictures showing the effect of such soil diseases as fusarium wilt of tomatoes, cabbage yellows, etc.; (Materials B; objectives 15, 16)

20. Study in textbook, and discuss the methods of avoiding loss because of soil diseases; (Materials A; objectives 15, 16)

21. On field trip study the effect of soil diseases on certain crops, such as fusarium disease on tomatoes, cabbage yellows on cabbage, etc.; (Materials C, D; objectives 15, 16)

22. On a field trip to a nearby farm, select the best site for the home orchard and the small fruit and vegetable gardens, considering all factors brought out previously; (Materials C; objective 17)

C. Selecting and purchasing seeds, trees, and plants

23. Study seedsmen's and nursery catalogues; (Materials A; objectives 18 to 26, incl.)

24. Listen to a talk on the reliability of dealers and growers of nursery stock and vegetable seeds; (Materials A; objective 18)

25. Make out an order for fruit trees, shrubs, and vegetable seeds adapted to local climatic and soil conditions; (Materials C; objectives 19, 26)

26. Study in textbook and in bulletins amounts and kinds of fruits and vegetables most desirable for immediate use in the farm home, for home storage, and to meet the market demands; (Materials A; objectives 20, 21, 22, 23, 24, 25)

27. Make a list of the fruits and vegetables most desirable for immediate use, for home storage, and to meet the market demands; (Materials A; objectives 19 to 25, incl.)

28. Examine home orchards in the community and list the kinds and varieties of fruits included; (Materials C, D; objectives 20, 21, 22)

29. Examine commercial orchards in the community and list the kinds and varieties of fruits included; (Materials C, D; objective 23)

30. Listen to a lecture and study in textbook and bulletins the number of each kind of trees and bushes to include in the orchard and small fruit garden for a family of a given size; (Materials A; objective 24)

31. Study in textbook and bulletins the amounts of each kind and variety of vegetable to include in the home vegetable garden; (Materials A; objective 25)

32. Determine the amount of each kind and variety of fruits and vegetables for the home of each member of the class, considering the various factors involved; (Materials A, C; objectives 24, 25)

D. Making plans for the garden and orchard

33. Study in the textbook and bulletins, and discuss the importance of making careful plans of the orchard, small fruit garden, or vegetable garden; (Materials A; objectives 27, 28, 29, 30, 31)

34. Examine representative plans of vegetable gardens; (Materials A, B; objective 28)

35. Make a plan for a vegetable garden to serve the needs of your own family; (Materials C; objective 28)

36. Make a plan of an orchard and small fruit garden for your own family needs; (Materials C; objective 29)

37. Discuss the importance of careful planning in any kind of farm work, especially in the horticultural activities under consideration; (Materials A; objectives 30, 31)

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